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The Design of Virtual Laboratory-Based Learning Media For Practice Activities in the Management Departement in the Application Software Course

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ABSTRACT

With the rapid development of technology and now, the greater the effort to increase the renewal of learning media in the use of results to support the learning process. Educators are required to be able to use media that can help the teaching and learning process. One of the uses of technology in developing learning media is the use of virtual laboratories. Virtual Laboratories are laboratories in the form of interactive multimedia-based software, which are computer-operated and can be used in laboratories. This Virtual Laboratory can be used in the course of Financial Application Software, Marketing Application Software and HR Application Software. By utilizing learning media using virtual laboratories can improve effective learning skills, can improve the reach of the teaching and learning process. There is no time and space. By utilizing this virtual laboratory, it can also eliminate obstacles in the learning process in the classroom. The system development methodology in this study is Prototyping-Based Methodology. The design of this virtual management learning media can make the process more interesting and not boring and allow students to learn teaching materials and include accessing and uploading tasks and also exercises to help students

Keywords: Virtual Laboratory, Software, Application

INTRODUCTION

The development of science and also supported by the rapid development of technology can create new innovations. Progress and the development of science and technology today do not escape the achievement of national education goals. The success of an education has a major factor, namely the curriculum, lecturers and the teaching and learning process. Every learning requires a strategy, method, and learning media that can have a positive effect on students. This is so that the achievements of students experience progress and the achievement of the expected national education goals.

Efforts are being made to increase the level of understanding of students one of which is in the selection of the right learning media. At present the application of information technology as a learning medium is very high and its development is very fast. One of the applications of information technology for learning media is the use of Virtual laboratories

Virtual laboratories are a series of laboratory instruments in the form of interactive multimedia-based computer software, which is operated using a computer and can simulate activities in the laboratory as if the user was in a real laboratory. A potential virtual laboratory to provide significant improvements and a more effective learning experience. The development of this virtual laboratory is expected to solve learning problems experienced by students

The scope of the development of this virtual laboratory is limited to several Software subjects in the Management Department. The courses that use Virtual Laboratory facilities are Communication Applications, Marketing Application Software and HR Application Software. In the learning process can be done in two ways, namely directly in the classroom and through a virtual laboratory, where in the virtual laboratory the lecturers can upload teaching materials, assignments, and participants who can help the material and tasks

LITERATURE REVIEW

Laboratory
Laboratory is an academic support unit in an educational institution, in the form of a closed or open space, permanent or mobile, systematically managed for testing, calibration, and / or production activities on a limited scale, using equipment and materials based on certain scientific methods,

in the framework of implementation education, research, and / or community service. (PERMENPAN No. 3 of 2010)

Type of Laboratory based on PERMENPAN No. 3 of 2010, divided into 4 categories:

1. Type I Laboratories are basic science laboratories found in schools at secondary education level, or technical implementing units that carry out education and / or training with category I and II equipment supporting facilities, and managed materials are general category materials to serve educational activities student.

2. Type II laboratories are basic science laboratories located in preparatory level colleges (semester I, II), or technical implementing units that carry out education and / or training with category I and II equipment supporting facilities, and managed materials are categorical materials general to serve student education activities.

3. Type III laboratory is a scientific field laboratory in the department or study program, or a technical implementing unit that carries out education and / or training with equipment supporting categories I, II, and III, and the material managed is general and special category material for serving educational activities, and research of students and lecturers.

4. Type IV laboratories are integrated laboratories located in faculties or university study centers, or technical implementing units that carry out education and / or training with equipment facilities in categories I, II and III, and managed materials are general and special category materials to serve research activities, and community service, students and lecturers.

Practice

Practicum is a subsystem of lectures which is a structured and scheduled activity that provides opportunities for students to gain real experience in order to improve students' understanding of theory or so that students master certain skills related to a knowledge or subject.

Virtual Laboratories

Virtual laboratories are interactive media to create and conduct stimulation experiments, playgrounds to experiment which consist of domain dependent simulation programs, experimental units called objects that include data files, devices operating on objects, and reference books. Based on the opinion of several experts regarding the understanding of the

Virtual Laboratory, it can be concluded that the Virtual Laboratory is a laboratory in the form of computer programs containing experimental simulations such as in real laboratories which can be used as supporting learning activities to understand a concept if practicum is not possible . Mihaela in Jaya (2012)

Strengths and weaknesses of virtual laboratories
The use of virtual laboratories provides opportunities for students to conduct practicums independently according to work procedures. Students are free to use laboratory tools and materials virtually without any fear of being wrong and can develop new ideas for conducting experiments. According to Ariani and Haryanto (2010: 167), virtual laboratories are very useful when real experiments are impossible or too expensive and dangerous to implement. Virtual laboratories allow students to do practicums or experiments as if they are facing practical situations and using equipment in real laboratories.

According to Anonymous (2016) suggests the advantages of using virtual laboratories, Are as follows:

a) It is possible to learn comfortably because the tools and materials are simulated in a virtual computer so that they are not too dangerous.
b) Learners can learn and develop creativity to experiment easily.
c) Presentation of the problem can be presented using virtual on the computer to cause student motivation.
d) The desire of students to learn will be increased because it is taught by more interesting animation.
e) Virtual laboratories do not need too long to prepare and carry out activities because they are already presented on the computer.
f) Can encourage learners to be more effective and active in the learning process.
g) Calculation of experimental data results is more valid and precise so that it will be easier to obtain the concepts presented.

Herga, et al (2016) stated that one of the advantages of using a virtual laboratory is the visualization at the submicroscopic level. There is a submicroscopicisualization. In a virtual laboratory can be used as an alternative learning because traditional teaching is not enough to attract students and considered boring (Gustiani, 2014).

RESEARCH METHOD
The following are the architectures used in building a Virtual Laboratory
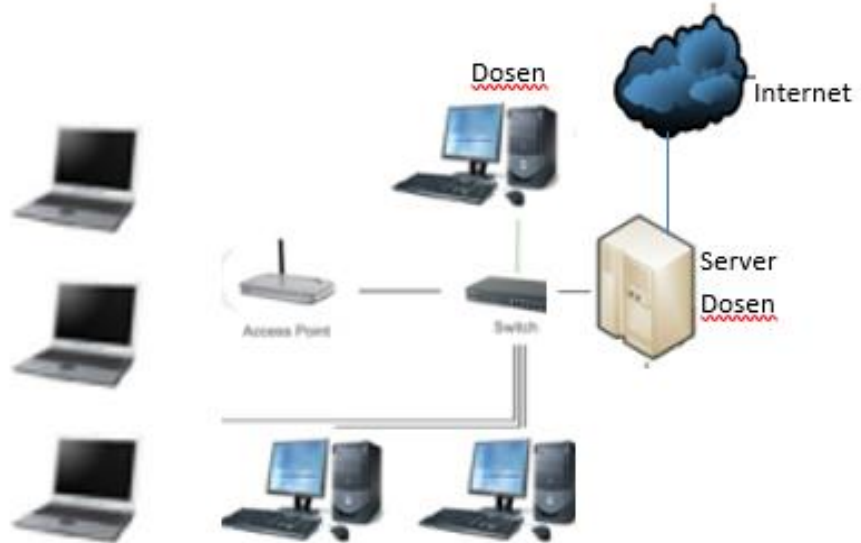

Figure 1 Virtual Laboratory Architecture

The system development methodology used in this research is
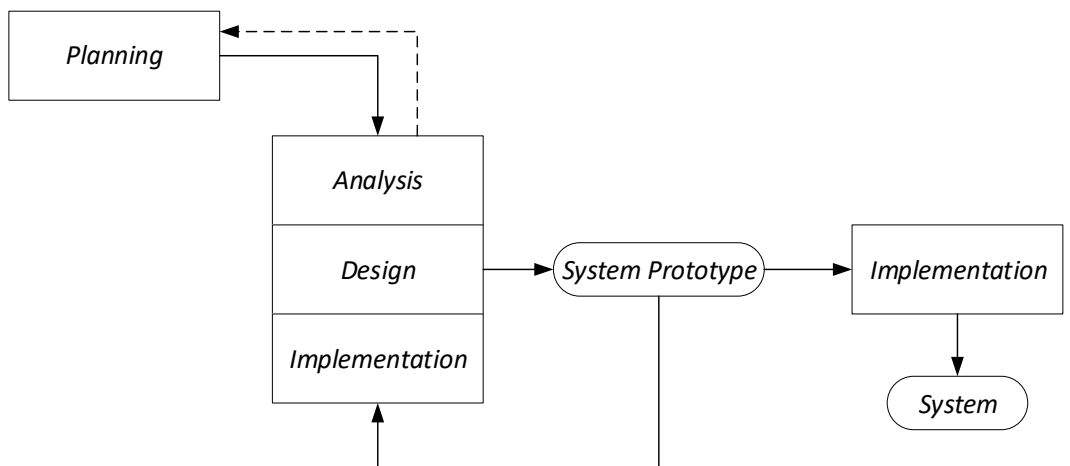Prototyping-Based Methodology, where the stages can be seen in Figure 2.

Figure 2. Prototyping-Based Methodology

Prototyping-Based Methodology performs the stages of analysis, design, and implementation simultaneously. These three phases are carried out repeatedly in one cycle until the system is completed. With this methodology, the basics of analysis and design are carried out, then the work begins immediately by building a system prototype in the form of a program that is developed quickly with a minimum number of features. The first prototype is usually the initial part of the system to be tested. This is shown to users who commented on the prototype. This comment is used to re-analyze, redesign, and re-apply the second prototype, which provides several additional features. The process will continue in a cycle until system analysts and users agree that the prototype has provided sufficient functionality to be installed and used in the organization. After the prototype has been fully assessed, the prototype deserves to be called a "system" and then it is installed. The repair will probably continue to be carried out by the system received by the user as a new system in the organization.

The main advantage of Prototyping-Based Methodology is that it can quickly provide a system where users can interact, even though initially it is not ready for widespread use by the organization. The prototype can convince users that the project team is working on the system (there are no long delays where the user sees little progress), and the prototype helps to more quickly meet actual user requirements

Tools Used

Prototyping-Based Methodology is one of the methodologies commonly used in Object-Oriented Systems Analysis and Design (OOSAD. Therefore, the system components in this study are modeled using the Unified Modeling Language (UML). The tools commonly used are Use Case diagrams, Activity diagrams, Sequence diagrams and Class diagrams.

FINDINGS AND DISCUSSION

Virtual Laboratory System Flow
Virtual Laboratory Design has been successfully designed. This is done as a guide to making the code / coding program needed, so that the results obtained are in accordance with the analysis. In the picture below is the flow to enter / login to the Virtual Laboratory This path starts from the login process to the dialog to display the Task Module, Teaching Material and Meeting
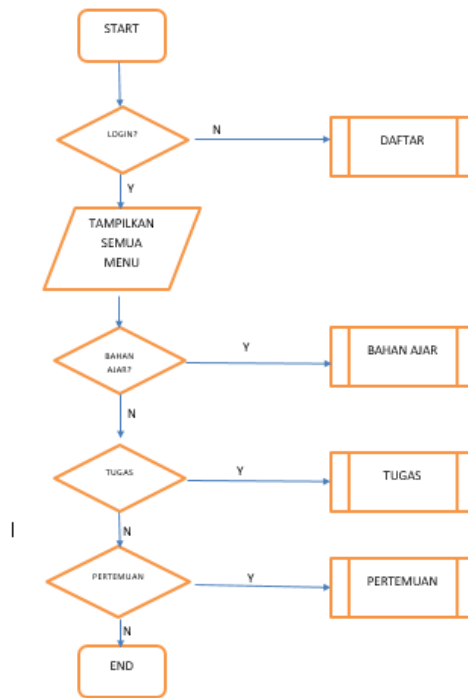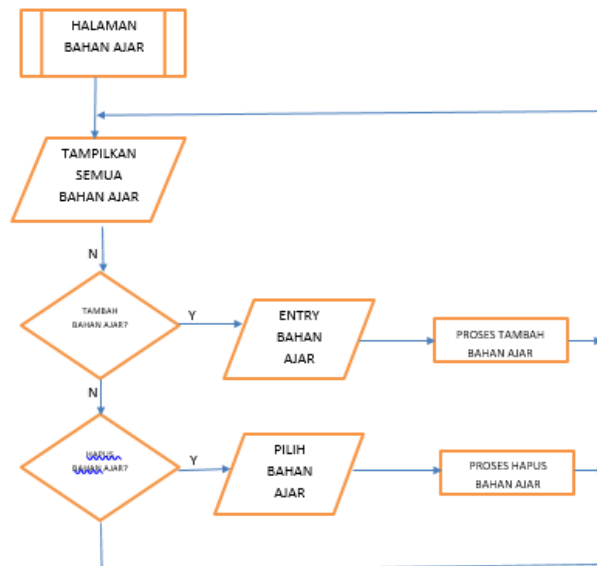
Figure 3 Program Logic

Figure 4 Flowchart of the Learning Material Page Program Logic

Virtual Laboratory Interface which is the interface to enter into a virtual laboratory. There is a special login for Lecturers and students

Figure 5 Login Menu Display

The following is the main menu of the Virtual Laborium
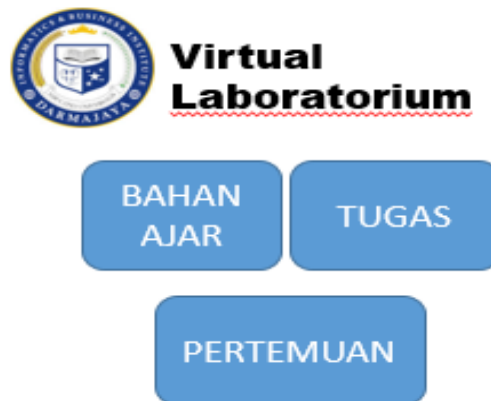

Figure 6 Display of the Main Menu

CONCLUSION

Based on analysis, design, implementation, discussions that have been carried out in the design of Virtual Laboratory-based learning media, the following conclusions can be drawn:

1. A Virtual Laboratory has been built to support courses in Financial Application Software, Marketing Application Software and HR Application Software using the PHP programming language.
2. With the establishment of the Virtual Laboratory can facilitate the learning process for lecturers and students. Learning process is not bound by space and time
3. The utilization of this Virtual Laboratory can make it easier for lecturers to monitor the level of activity of students studying the material provided and bind the ability of students to study independently

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